



SLOVENSKI STANDARD
SIST EN 12975-1:2006+A1:2011
01-februar-2011

**Toplotni sončni sistemi in sestavni deli - Sprejemniki sončne energije - 1. del:
Splošne zahteve**

Thermal solar systems and components - Solar collectors - Part 1: General requirements

Thermische Solaranlagen und ihre Bauteile - Kollektoren - Teil 1: Allgemeine Anforderungen

Installations solaires thermiques et leurs composants - Capteurs solaires - Partie 1 : Exigences générales

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EUROPEAN STANDARD
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Thermal solar systems and components - Solar collectors - Part 1: General requirements

Installations solaires thermiques et leurs composants -
Capteurs solaires - Partie 1 : Exigences générales

Thermische Solaranlagen und ihre Bauteile - Kollektoren -
Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 6 February 2006 and includes Amendment 1 approved by CEN on 7 September 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 12975-1:2006+A1:2010) has been prepared by Technical Committee CEN/TC 312 "Thermal solar systems and components", the secretariat of which is held by ELOT.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes A1 EN 12975-1:2006 A1.

This document includes Amendment 1 approved by CEN on 2010-09-07.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this standard, it is pointed out that:

- a) This standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;
- b) It should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

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1 Scope

This European Standard specifies requirements on durability (including mechanical strength), reliability and safety for liquid heating solar collectors. It also includes provisions for evaluation of conformity to these requirements.

It is not applicable to those collectors in which the thermal storage unit is an integral part of the collector to such an extent, that the collection process cannot be separated from the storage process for the purpose of making measurements of these two processes. ^{A1} It is basically applicable to concentrating collectors; thermal performance testing as given in EN 12975-2:2006, 6.3. (quasi dynamic testing) is also applicable to most concentrating collector designs, from stationary non-imaging concentrators as CPCs to high concentrating tracking designs. ^{A1}

Collectors that are custom-built (built in, roof integrated collectors that do not comprise factory made modules and are assembled directly on the place of installation) cannot be tested in their actual form for durability, reliability and thermal performance according to this standard. Instead, a module with the same structure as the ready collector is tested. The module gross area in the case of custom built collectors should be at least 2 m². The test is valid only for larger collectors, than the tested module.

For collectors the national and European Guidelines for Structural Planning and overhead glazing are not valid. Therefore this standard should be applied for the design of the static of the collector.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- <https://standards.iteh.ai/catalog/standards/sist/efa7014c-68e3-4304-9e55-2603a474d50/sist-en-12975-1-2006-a1-2011>
 EN 12975-2:2006, *Thermal solar systems and components – Solar collectors – Part 2: Test methods*
 EN ISO 9488, *Solar energy – Vocabulary (ISO 9488:1999)*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 9488 apply.

4 Symbols and units

For the purposes of this European Standard, the symbols and units given in EN ISO 9488 and EN 12975-2:2006 apply.

5 Durability and reliability

5.1 Materials and design

Information about the materials and manufacture of solar collectors, including the materials they are manufactured of and their resistance to all influences which they might meet in service, retaining their operational ability are given in Annex A.

EN 12975-1:2006+A1:2010 (E)**5.2 Required tests**

The collector shall be subjected to the following series of tests:

- a) Internal pressure for absorber (see 5.2 of EN 12975-2:2006);
- b) High temperature resistance (see 5.3 of EN 12975-2:2006);
- c) Exposure (see 5.4 of EN 12975-2:2006);
- d) External thermal shock. May be combined with the high temperature resistance or exposure test (see 5.5 of EN 12975-2:2006);
- e) Internal thermal shock. May be combined with the high temperature resistance or exposure test (see 5.6 of EN 12975-2:2006);
- f) Rain penetration, only for glazed collectors (see 5.7 of EN 12975-2:2006);
- g) Mechanical load (see 5.9 of EN 12975-2:2006);
- h) Thermal performance (see Clause 6 of EN 12975-2:2006);
- i) Freeze resistance, only in the cases specified in 5.8 of EN 12975-2:2006;
- j) Stagnation temperature (see Annex C of EN 12975-2:2006). May be combined with the high temperature resistance or exposure test.
- k) Final inspection (see 5.11 of EN 12975-2:2006).

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The optional test for impact resistance (see 5.10 of EN 12975-2:2006) shall be carried out if requested. The result shall be recorded.

NOTE Regarding the durability and reliability of elastic materials it is recommended to refer to ISO 9808 and ISO 9553.

5.3 Pass criteria**5.3.1 General**

The pass criteria for the reliability tests are given for each test in 5.3.2 to 5.3.10. The term "no major failure", denotes that none of the following occurs:

- Absorber leakage or such deformation that permanent contact between absorber and cover is established;
- Breaking or permanent deformation of cover or cover fixing;
- Breaking or permanent deformation of collector fixing points or collector box;
- Vacuum loss, such that vacuum or subatmospheric collectors shall be classified according to the definition in EN ISO 9488 (only applicable for vacuum and subatmospheric collectors);
- Accumulation of humidity in form of condensate on the inside of the transparent cover of the collector exceeding 10 % of the aperture area.

NOTE The evaluation of accumulation of humidity for application of the pass criteria should be applied only on the following tests :

- external Thermal Shock
- Rain Penetration Test

5.3.2 Internal pressure for absorber

The test pressure shall be as specified in 5.2 of EN 12975-2:2006. In the case of absorbers made of organic materials, climate conditions according to Table 2 of EN 12975-2:2006 shall be applied. After the internal pressure test, the collector shall not show any major failure as defined in 5.3.1.

5.3.3 High temperature resistance

When tested in accordance with 5.3 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.4 Exposure

When tested in accordance with 5.4 of EN 12975-2:2006, the collector shall not show any major failure according to 5.3.1 and none of each potential problems of their components shall be graded 2 on the scale given in B.5.5 of EN 12975-2:2006.

5.3.5 External thermal shock

When tested in accordance with 5.5 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.6 Internal thermal shock

When tested in accordance with 5.6 of EN 12975-2:2006, the collector shall not show any major failure as defined in 5.3.1.

5.3.7 Rain penetration

NOTE This test is applicable only for glazed collectors.

A visual check shall not show any water trace. Moreover, at least one of the following shall be fulfilled:

- a) by weighing the collector the determined water quantity shall be less than 30 g/m² or
- b) by measuring the humidity inside the collector, any visible droplets inside the collector or humidity that exceeds 20 g/kg at any time during the test or humidity that doubles from the value measured after stabilisation shall yields to "major failure" or
- c) measured condensation level shall be less than 10 % of the transparent cover and the quantity of the water that comes out of the collector when tipping it shall be less than 30 g/m².

5.3.8 Mechanical load test

When tested in accordance with 5.9 of EN 12975-2:2006 the cover, the collector box and the fixings between collector box and mounting system shall not show any major failure as defined in 5.3.1 and 5.9.1.3 of EN 12975-2:2006. The permissible and the maximum positive and negative pressure shall be recorded in the installer manual.

NOTE Individual country's safety requirements may prevail.